THE CAUSES OF PERITONITIS.

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This great and finely-developed lining of the abdominal cavity and covering of the viscera contained therein perhaps stands third in frequency of involvement when narrowing our field to abdominal surgery being outdistanced only by the appendix and gallblader. It is the great barrier that separates those parts of the inner man contained above the diaphragm and below Poupart's ligament. The peritoneum, coming as it does from the hypoblastic layer of the blastoderm, is most intimately associated with the formation of the hind, mid and foregut in the development of the embryo from the ovum. During this process of expansion, inversion and interconnection of the gut, liver, spleen, etc., the peritoneum always follows, never leaving an exposed crevice or depression unprotected. This embryonic process, most interesting and important, would take great space to do full justice, and therefore for want of the same will not be entered into in more detail at this time. In considering the peritoneum under this head, namely, the causes of its inflammation, the omentum and mesentery will be coincluded as merely folds of the same. From an anatomical point of view the peritoneum acts to the abdominal viscera and parietes just as a sheet acts toward a sleeping babe encasing the viscera and lining the walls just as the sheet covers and underlies the babe, thus protecting it. The *omentum* besides acting in a relatively medium protective scope, as compared with the parietal and visceral peritoneum, gives great re-enforcement within the abdominal cavity by mechanically and physically connecting the stomach with the other organs of this cavity, as also does the mesentery act in the same way toward the intestines and their suspension from the posterior wall. By such formation and placement it can be seen how readily this part of our anatomy enters into the formation of the recto-vaginal pouch, vesico-uterine pouch, bursaomentalis, various ligaments of the liver, foramen of Winslowi, and so on the enumeration might continue. Histologically the highest type of ciliated endothelium lining this great cavity gives the peritoneum its magnificent resisting power, and combined with its serous nature comes its well known adhesive ability. Taking into consideration all of these embyronic, histologic and anatomic conditions we will now endeavor to see from wnat points the peritoneum may become infected and how the infection may extend. As has been previously stated the two abdominal points most often infected are the appendix and gall-bladder. Naturally the appendix leads, as it is more openly situated and in closer apposition to direct contamination. The appendix is freely exposed to the onslaught of the colon bacillus, typhoid bacillus, tubercle bacillus, streptococcus, staphylococcus, etc.

Whether or not these organisms will always gain fertile ground and cause a magnitude of disturbance remains for the resisting power of the tissues to determine. If this little body does become greatly inflamed and swollen, and concretions form or have formed previously it remains only for a pus producing organism to get in its work and result in perforation, thus contaminating the adjacent pertoneum and resulting in peritonitis. Here is the great alley of entrance, and how far such an infection may extend shall be determined by the protective power in the adhesive ability of the peritoneum itself. Such an infection could easily result in metastasis when the swaying, circulatory movements combined with the magnificent blood supply of this great serous cavity be taken into consideration. Secondly the gall-bladder plays its important part by way of an avenue. If this part of the anatomy become diseased the cause must come from the alimentary tract or the liver itself, barring external violence. Thus the same organisms that deal with the appendix would play a part here. If the gall-bladder be perforated by denudation of its wall by a stone the contamination of the peritoneum would immediately result, but excluding pus formation, the resulting peritonitis would not be as fulminative or severe considering the claimed antibacterial action of bile. If pus does form and the gall-bladder wall burst here would result a severe localized or general peritonitis depending upon the reactionary adhesive ability of the neighboring peritoneum. Next in order comes perforations of various parts of the alimentary tract excluding the one previously discussed, namely the appendix. Under this head would come perforations from typhoid ulcerations, perforations resulting from ulcers of the intestine with dysentery as the cause. Here the Amoebic variety would play the leading role having that peculiar serpiginous ulcer with its deep undermining edges and whether or not peritonitis was set up from this cause directly, later we might get it from the altogether too frequent complication of this disease, namely abscess of the liver, which occurs in about twenty per cent of the cases. Also the bacillary type of dysentery might be a direct cause, but not with the same frequency and not as dangerous indirectly because of the far less frequency of liver complication. Gastric or duodenal ulcer of the rapidly eroding type would also come under this head, especially the peptic form. From these various causes of alimentary perforations we can readily see how a local or general peritonitis would result with greater or less number of adhesions formed and how the resulting infection could readily be a very complicated and mixed one. As in dysentery the primary cause would be either the Amoeba Coli or the bacillus of Shiga depending upon the variety while the colon bacillus of Escherich, streptococus and staphylococcus might enter at the same time and get in its work just as it could mix the infection caused by the typhoid bacillus in a perforating typhoid ulcer. In the female we have extra organs to deal with as a pathway of infection. The uterus and its adnexia are invariably open to disease of some sort or another whether it be specific or otherwise. Gonnorrhea wending its way from the vagina into the womb and then up one or both of the Fallopian tubes directly into the abdominal cavity. With such a free access is it not a wonder that infection by this source is not more frequent especially when self-incurred abortions are so numerous as they are to-day? With the severe toxemias as septicaemia resulting as they do from many cases of this character it is wonderful that we do not get many more cases of that severe, stampeding form of general peritonitis which brings death in the first few hours unless scientific interference comes to their aid and even then the mortality from this self-induced trouble is very high. Tubercular spondylitis would well fit in here as an important indirect cause of this trouble. The vertebrae becoming necrosed, break down and the resulting abscess bursts, the pus burrows in the direction of least resistance, aided by gravity, resulting in the well known psoas abscess. This coming as it does from the region most often involved by Pott's disease namely, the dorsal and lumbar sections of the vertebral column, burrows its way down under the sheaths of these two great muscles, the psoas magnus and parvus, reaching the iliac fossa and again bursting from some cause or another setting up a tubercular process within the abdominal cavity if it has not already reached this part by metastasis. Acute or chronic pancreatitis, whether it be a complication or sequela of gastric and duodenal ulcer or gall-bladder trouble, if it be of the severe, resisting type would be in a very conspicuous place in putting forth its natural results as also would pyonephrosis, pyelitis and perinephritic abscess though entirely extra peritoneal, becoming secondary causes by the well known burrowing nature of pus when confined as it would be in or about the kidney surrounded by its mass of fat and areola tissue. Following these closely come empyaema of the necessitatis type, whether or not it result in sub-diaphragmatic abscess or direct burrowing. Renal lithiasis giving up a stone to its ureter the same perforating the wall of the latter as also might calculus in the urinary bladder perforate by denudation thus communicating with this great serous cavity. Malignancy in all of its forms involving the abdominal viscera or adjacent parts would by direct extension or meastisis cause a malignant peritonitis. Malaria and tropical disease, through the circulatory system, resulting in its pyaemic mode of spreading could easily affect this important visceral covering. So far nothing has been mentioned regarding the frequency of peritonitis from external violence of varying degrees, such as stab wounds of the lower back and abdomen, gun shot wounds, severe blows causing rupture of the spleen, etc., burns of varying degrees with their secondary influence upon the kidneys, duodenum and stomach giving indirect cause for peritonitis, or if rightly situated it may be a direct cause.

CONCLUSION.

It will be seen by the foregone drawn causes and results that the peritoneum is so constituted and situated that it lies in a direct or indirect path for infection from many causes and only by its histological make-up, anatomical formation and distribution, and functional ability to send forth its natural gluing secretion resulting in adhesions forming, that many times our anatomy is exempt from greater taxation by the usefulness of this great sheet barrack.

In treating any of these causes we should never forget how easily it may be for the peritoneum to become involved and our eyes should always be open to forestall such results if possible. Again also we must not forget that if any one or more of these causes does set up disease of the peritoneum that this same peritoneum is a gatling gun of defense in itself, and how many times it shuts off the progress of some dread disorder which if not walled off would invariably prove lethal.